Claim Amendments:

Please amend the claims as follows:

1. (Currently Amended) A high temperature superconductor comprising a drop in J_c of less than a factor of about 7 at a temperature of between about 30K to about 77K, and at a magnetic field of about 1 Tesla, when the magnetic field is applied normal to the surface of the superconductor, as compared to a J_c in the presence of no magnetic field, and comprising a peak in J_c when a magnetic field is applied perpendicular to a surface of the superconductor.

2. (Original) The high temperature superconductor of claim 1, wherein the superconductor comprises $RBa_2Cu_3O_{7-x}$, wherein R comprises at least one of: yttrium (Y), samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof.

3. (Original) The high temperature superconductor of claim 2, wherein x is greater than zero but less than one.

4. (Original) The high temperature superconductor of claim 1, wherein the superconductor comprises a superconducting film on a metal tape.

5. (Currently Amended) The high temperature superconductor of claim 1, wherein[[,]] said peak in J_c when a magnetic field is applied perpendicular to a surface of the superconductor, ~~the superconductor has a peak J_c that~~ is at least about 50% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

6. (Original) The high temperature superconductor of claim 1, wherein, when a magnetic field is applied in any orientation with respect to a surface of the superconductor, the superconductor has a J_c value that is at least about 50% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

7. (Original) The high temperature superconductor of claim 2, wherein the superconductor comprises at least one layer of $RBa_2Cu_3O_{7-x}$ and at least one layer of $YBa_2Cu_3O_{7-x}$, wherein R comprises at least one of: yttrium (Y), samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof, and wherein x is greater than zero but less than one.

8. (Original) The high temperature superconductor of claim 1, wherein the high temperature superconductor is utilized in at least one of: a power cable, a power transformer, a power generator, and a power grid.

9. (Original) The high temperature superconductor of claim 8, wherein the power cable comprises a conduit for passage of a cooling fluid, and wherein the high temperature superconductor is disposed proximate the conduit.

10. (Original) The high temperature superconductor of claim 9, wherein the power cable comprises at least one of: a power transmission cable and a power distribution cable.

11. (Original) The high temperature superconductor of claim 8, wherein the power transformer comprises one or more windings, wherein at least one winding comprises the high temperature superconductor.

12. (Original) The high temperature superconductor of claim 8, wherein the power generator comprises:

a shaft coupled to a rotor comprising at least one electromagnet comprising one or more rotor coils, and

a stator comprising a conductive winding surrounding the rotor,

wherein the conductive winding or at least one of the rotor coils comprises the high temperature superconductor.

13. (Original) The high temperature superconductor of claim 8, wherein the power grid comprises:

a power generation station comprising a power generator;

a transmission substation comprising at least one power transformer for receiving power from the power generation station, and for stepping-up voltage for transmission;

at least one power transmission cable for transmitting power from the transmission substation;

a power substation comprising at least one power transformer for receiving power from the power transmission cables, and for stepping-down voltage for distribution; and

at least one power distribution cable for distributing power to an end user.

14. (Currently Amended) A high temperature superconductor having superior performance in the presence of a magnetic field, the superconductor comprising:

a substrate;

at least one buffer layer disposed on a surface of the substrate;

at least one superconducting layer disposed over the at least one buffer layer, wherein the at least one superconducting layer comprises a rare-earth-Ba-Cu-O composition, and wherein the superconductor comprises a drop in J_c of less than a factor of about 7 at a temperature of between about 30K to about 77K, and at a magnetic field of about 1 Tesla, when the magnetic field is applied normal to the surface of the superconductor, as compared to a J_c in the presence of no magnetic field, and comprises a peak in J_c when a magnetic field is applied perpendicular to a surface of the superconductor.

15. (Original) The high temperature superconductor of claim 14, wherein the rare-earth-Ba-Cu-O composition comprises at least one of: yttrium (Y), samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof.

16. (Original) The high temperature superconductor of claim 14, wherein the at least one superconducting layer comprises a single layer of a rare-earth-Ba-Cu-O material comprising at least one of yttrium (Y), samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof.

17. (Original) The high temperature superconductor of claim 14, wherein the at least one superconducting layer comprises a layer of a rare-earth-Ba-Cu-O material comprising at least one of yttrium (Y), samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof, sandwiched between two layers of $YBa_2Cu_3O_{7-x}$, wherein x is greater than zero and less than one.

18. (Currently Amended) The high temperature superconductor of claim 14, wherein said peak in J_c when a magnetic field is applied perpendicular to a surface of the superconductor~~, the superconductor has a peak J_c that~~ is at least about 90% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

19. (Currently Amended) The high temperature superconductor of claim 14, wherein said peak in J_c when a magnetic field is applied perpendicular to a surface of the superconductor~~, the superconductor has a peak J_c that~~ is at least about 70% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

20. (Original) The high temperature superconductor of claim 14, wherein, when a magnetic field is applied in any orientation with respect to a surface of the superconductor, the superconductor has a J_c value that is at least about 50% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

21. (Original) The high temperature superconductor of claim 14, wherein the substrate comprises a superconducting film on a metal tape.

22. (Original) The high temperature superconductor of claim 14, wherein the high temperature superconductor is utilized in at least one of: a power cable, a power transformer, a power generator, and a power grid.

23. (Original) The high temperature superconductor of claim 22, wherein the power cable comprises a conduit for passage of a cooling fluid, and wherein the high temperature superconductor is disposed proximate the conduit.

24. (Original) The high temperature superconductor of claim 23, wherein the power cable comprises at least one of: a power transmission cable and a power distribution cable.

25. (Original) The high temperature superconductor of claim 22, wherein the power transformer comprises one or more windings, wherein at least one winding comprises the high temperature superconductor.

26. (Original) The high temperature superconductor of claim 22, wherein the power generator comprises:

a shaft coupled to a rotor comprising at least one electromagnet comprising one or more rotor coils, and

a stator comprising a conductive winding surrounding the rotor,

wherein the conductive winding or at least one of the rotor coils comprises the high temperature superconductor.

27. (Original) The high temperature superconductor of claim 22, wherein the power grid comprises:

a power generation station comprising a power generator;

a transmission substation comprising at least one power transformer for receiving power from the power generation station, and for stepping-up voltage for transmission;

at least one power transmission cable for transmitting power from the transmission substation;

a power substation comprising at least one power transformer for receiving power from the power transmission cables, and for stepping-down voltage for distribution; and

at least one power distribution cable for distributing power to an end user.

28. (Currently Amended) A tape-formed oxide superconductor having minimal degradation of J_c when a magnetic field is applied normal to the superconductor's surface, the superconductor comprising:

a metal tape substrate;

at least one buffer layer overlying a surface of the metal tape substrate;

a first superconducting layer comprising $YBa_2Cu_3O_{7-x}$ overlying the at least one buffer layer;

a second superconducting layer comprising $RBa_2Cu_3O_x$ overlying the first superconducting layer, wherein R comprises at least one of: samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof;

and a third superconducting layer comprising $YBa_2Cu_3O_{7-x}$ overlying the second superconducting layer,

wherein x is greater than zero and less than one, and wherein when a magnetic field is applied perpendicular to a surface of the tape-formed oxide superconductor, the tape-formed oxide superconductor has a peak J_c.

29. (Currently Amended) The tape-formed oxide superconductor of claim 28, wherein said peak J_c when a magnetic field is applied perpendicular to a surface of the tape-formed oxide superconductor~~, the tape-formed oxide superconductor has a peak J_c that~~ is about 50-90% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the tape-formed oxide superconductor.

30. (Original) The high temperature superconductor of claim 28, wherein, when a magnetic field is applied in any orientation with respect to a surface of the superconductor, the superconductor has a J_c value that is at least about 50% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

31. (Original) The tape-formed oxide superconductor of claim 28, wherein the tape-formed oxide superconductor comprises a drop in J_c of less than a factor of about 7 at a temperature of between about 30K to about 77K, and at a magnetic field of about 1 Tesla, when the magnetic field is applied normal to the surface of the tape-formed oxide superconductor, as compared to a J_c in the presence of no magnetic field.

32. (Original) The high temperature superconductor of claim 28, wherein the high temperature superconductor is utilized in at least one of: a power cable, a power transformer, a power generator, and a power grid.

33. (Original) The high temperature superconductor of claim 32, wherein the power cable comprises a conduit for passage of a cooling fluid, and wherein the high temperature superconductor is disposed proximate the conduit.

34. (Original) The high temperature superconductor of claim 33, wherein the power cable comprises at least one of: a power transmission cable and a power distribution cable.

35. (Original) The high temperature superconductor of claim 32, wherein the power transformer comprises one or more windings, wherein at least one winding comprises the high temperature superconductor.

36. (Original) The high temperature superconductor of claim 32, wherein the power generator comprises:

a shaft coupled to a rotor comprising at least one electromagnet comprising one or more rotor coils, and

a stator comprising a conductive winding surrounding the rotor,

wherein the conductive winding or at least one of the rotor coils comprises the high temperature superconductor.

37. (Original) The high temperature superconductor of claim 32, wherein the power grid comprises:

a power generation station comprising a power generator;

a transmission substation comprising at least one power transformer for receiving power from the power generation station, and for stepping-up voltage for transmission;

at least one power transmission cable for transmitting power from the transmission substation;

a power substation comprising at least one power transformer for receiving power from the power transmission cables, and for stepping-down voltage for distribution; and

at least one power distribution cable for distributing power to an end user.

38. (Original) A tape-formed oxide superconductor having minimal degradation of J_c when a magnetic field is applied normal to the superconductor's surface, the superconductor comprising:

a metal tape substrate;

at least one buffer layer overlying a surface of the metal tape substrate;

at least one superconducting layer comprising $(YR)_1Ba_2Cu_3O_{7-x}$ overlying the at least one buffer layer;

wherein R comprises at least one of: samarium (Sm), ytterbium (Yb), neodymium (Nd), gadolinium (Gd), europium (Eu), lanthanum (La), dysprosium (Dy), holmium (Ho), and mixtures thereof, and wherein x is greater than zero and less than one.

39. (Original) The tape-formed oxide superconductor of claim 38, wherein when a magnetic field is applied perpendicular to a surface of the tape-formed oxide superconductor, the tape-formed oxide superconductor has a peak J_c that is about 50-90% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the tape-formed oxide superconductor.

40. (Original) The high temperature superconductor of claim 38, wherein, when a magnetic field is applied in any orientation with respect to a surface of the superconductor, the superconductor has a J_c value that is at least about 50% of the peak J_c that exists when the magnetic field is applied parallel to the surface of the superconductor.

41. (Original) The tape-formed oxide superconductor of claim 38, wherein the tape-formed oxide superconductor comprises a drop in J_c of less than a factor of about 7 at a temperature of between about 30K to about 77K, and at a magnetic field of about 1 Tesla, when the magnetic field is applied normal to the surface of the tape-formed oxide superconductor, as compared to a J_c in the presence of no magnetic field.

42. (Original) The high temperature superconductor of claim 38, wherein the high temperature superconductor is utilized in at least one of: a power cable, a power transformer, a power generator, and a power grid.

43. (Original) The high temperature superconductor of claim 42, wherein the power cable comprises a conduit for passage of a cooling fluid, and wherein the high temperature superconductor is disposed proximate the conduit.

44. (Original) The high temperature superconductor of claim 43, wherein the power cable comprises at least one of: a power transmission cable and a power distribution cable.

45. (Original) The high temperature superconductor of claim 42, wherein the power transformer comprises one or more windings, wherein at least one winding comprises the high temperature superconductor.

46. (Original) The high temperature superconductor of claim 42, wherein the power generator comprises:

a shaft coupled to a rotor comprising at least one electromagnet comprising one or more rotor coils, and

a stator comprising a conductive winding surrounding the rotor,

wherein the conductive winding or at least one of the rotor coils comprises the high temperature superconductor.

47. (Original) The high temperature superconductor of claim 42, wherein the power grid comprises:

a power generation station comprising a power generator;

a transmission substation comprising at least one power transformer for receiving power from the power generation station, and for stepping-up voltage for transmission;

at least one power transmission cable for transmitting power from the transmission substation;

a power substation comprising at least one power transformer for receiving power from the power transmission cables, and for stepping-down voltage for distribution; and

at least one power distribution cable for distributing power to an end user.